ZooKeys 1092: 123–146 (2022)
doi: 10.3897/zookeys.1092.80645
https://zookeys.pensoft.net

RESEARCH ARTICLE

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Two new species of *Platensina* Enderlein (Diptera, Tephritidae, Tephritinae, Dithrycini) from India

K. J. David[1], D. L. Hancock[2], K. Sachin[1], R. G. Gracy[1], S. Salini[1]

1 *National Bureau of Agricultural Insect Resources, Bengaluru-560024, Karnataka, India* **2** *60 South Street, Carlisle, Cumbria CA1 2EP, UK*

Corresponding author: K. J. David (davidkj.nbaii@gmail.com)

Academic editor: Marc De Meyer | Received 17 January 2022 | Accepted 9 March 2022 | Published 6 April 2022

http://zoobank.org/0CF61CB2-219C-4764-93B0-AFDCA72D9591

Citation: David KJ, Hancock DL, Sachin K, Gracy RG, Salini S (2022) Two new species of *Platensina* Enderlein (Diptera, Tephritidae, Tephritinae, Dithrycini) from India. ZooKeys 1092: 123–146. https://doi.org/10.3897/zookeys.1092.80645

Abstract

Two new species of *Platensina* Enderlein, *P. rabbanii* David & Hancock, **sp. nov.**, and *P. flavistigma* David & Hancock, **sp. nov.**, are described from Meghalaya and southern India, respectively. *Platensina rabbanii* can be differentiated from *P. alboapicalis* Hering by the presence of a single hyaline indentation in cell r_1 and the apical hyaline band in cell r_{2+3} restricted to the apex; *P. flavistigma* differs from *P. quadrula* Hardy by the presence of a yellow/fulvous pterostigma and shape of the epandrium. DNA barcode sequences of *P. acrostacta* (Wiedemann), *P. flavistigma* and *P. platyptera* Hendel were obtained and reported. Post-abdominal descriptions and illustrations of *P. acrostacta*, *P. platyptera* and *P. zodiacalis* (Bezzi) are also provided along with keys to all 23 species and the 7 known from India.

Keywords

Identification key, *Ludwigia*, Meghalaya, Onagraceae, Platensinina, south India

Introduction

Platensina Enderlein is predominantly an Oriental and Australasian genus with 24 species recognized by Norrbom et al. (1999) [some generically misplaced] and 21 by Hancock (2012). They are medium-sized flies with broad, dark brown wings with hyaline indentations and spots. Host plants are not recorded except for *Platensina acrostacta* (Wiedemann), reared from stem galls of an undetermined *Ludwigia* species

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in southern India (Hardy 1973; Hancock 2012). Agarwal and Sueyoshi (2005) listed five species from India, while David and Ramani (2011) provided keys to four species from peninsular India and the Andaman and Nicobar Islands. Hancock (2012) recorded *P. platyptera* Hendel and *P. quadrula* Hardy from India, regarded records of *P. amplipennis* (Walker) from India as misidentifications of *P. platyptera* and provided a key to species of *Platensina*. In this paper two new species, one collected from Meghalaya and one from southern India, are described, along with descriptions of postabdominal structures of other species recorded from India except *P. tetrica* Hering and *P. fulvifacies* Hering, as specimens of these two taxa were not available for study. A key to species of *Platensina* recorded from India is provided, together with a revised key to all known species.

Material and methods

Specimens studied are deposited in the National Insect Museum, ICAR – National Bureau of Agricultural Insect Resources, Bengaluru, India (**NIM**).

Collections were done by sweep netting. Images of specimens were taken using a Leica DFC 420 camera mounted on a Leica M205A stereo zoom microscope; images of genitalia were taken using an 8 MP camera temporarily attached to a Leica DM 1000 compound research microscope; the images were stacked and combined to a single image using Combine ZP (Hadley 2011). Measurements of male and female genitalia were taken using Leica Automontage Software, LAS 3.4. Terminology adopted here follows White et al. (1999) and wing terminology by Cumming and Wood (2017).

One hind leg was removed from one specimen of each of three species and used for DNA extraction. The DNA extraction was performed using a DNeasy Blood and Tissue Kit (Qiagen India Pvt. Ltd.) following the manufacturers' instruction. For the molecular study, the standard DNA barcoding region of the mitochondrial COI gene was sequenced and the PCR was performed using the Universal COI primers (LCO1490/HCO2198) (David et al. 2020). The sequences were annotated using NCBI Blast tools and submitted to the NCBI GenBank Database where accession numbers were obtained (*Platensina flavistigma* – MT019893; *Platensina acrostacta* – MT019891; *Platensina platyptera* – MW448367).

The pairwise genetic distance between three species of *Platensina* viz., *P. acrostacta*, *P. platyptera* and *P. flavistigma* has been calculated using mitochondrial COI gene sequences. Analyses were conducted using the Maximum Composite Likelihood model (Tamura et al. 2004). This analysis involved 4 nucleotide sequences. Codon positions included were $1^{st}+2^{nd}+3^{rd}$. All positions with less than 95% site coverage were eliminated, i.e., fewer than 5% alignment gaps, missing data, and ambiguous bases were allowed at any position (partial deletion option). There were a total of 557 positions in the final dataset. Evolutionary analyses were conducted in MEGA11 (Tamura et al. 2021).

Results

Taxonomy

Platensina Enderlein, 1911

Platensina Enderlein, 1911: 454. Type species: *Platensina sumbana* Enderlein.
Tephrostola Bezzi, 1913: 153. Type species: *Trypeta acrostacta* Wiedemann.

Diagnosis. Medium-sized flies (4–5 mm long), with frons as wide as long, three frontal setae, two orbital setae, well developed ocellar setae. First flagellomere shorter than face, with short-pilose arista, face usually fulvous, black in males of a few species. Scutum grey pubescent with yellow-white reclinate setulae; scutellum flat with one or two pairs of setae, apical pair less than half length of basal setae or absent. Wing broad, often distinctly angled along posterior margin, dark brown with hyaline indentations and subhyaline spots. Abdomen predominantly black with fulvous lateral regions. Epandrium broad, without demarcation between epandrium and lateral surstylus, lateral surstylus broad, epandrium elongate-oval in posterior view; medial surstylus with well sclerotised prensisetae (lateral one broader than medial one), proctiger not higher than epandrium, glans of phallus stout, with single sclerotised acrophallus. Taeniae short (0.25 of eversible membrane); spicules on eversible membrane conical; aculeus dorsoventrally flattened, tip conical, with reduced preapical setae; spermathecae club-shaped, with numerous papillae.

Key to species of *Platensina* from India

1 Apex of wing hyaline from middle of cell r_{2+3} to cell cua (Fig. 6); posterior wing margin not distinctly angled near apex of cell cua..... .....***P. rabbanii* David & Hancock sp. nov.**

– Wing with a hyaline spot restricted to apex of cell r_{4+5} (e.g. Figs 16, 20, 21); posterior wing margin distinctly angled near apex of cell cua **2**

2 Wing with discal spots small and often indistinct or subhyaline; cell r_1 with 0–2 small hyaline indentations from costa in basal portion beyond stigma, often not crossing cell; cell cua with 3 small, isolated hyaline marginal spots and with or without additional small, isolated discal spots; holotype illustrated by Hering 1939a, fig. 14.....***P. tetrica* Hering, 1939**

– Wing with distinct hyaline discal spots; hyaline indentations in basal portion of cell r_1 with at least the basal one broad and crossing into cell r_{2+3}; cell cua with 2–3 hyaline marginal indentations, the basal pair usually elongate but often divided medially into 2 separate spots **3**

3 Wing (Figs 20, 21) with pterostigma entirely dark brown to black, 2 elongate marginal hyaline indentations in cell r_1, both crossing vein R_{2+3} into cell r_{2+3}, no marginal preapical hyaline spots in cell r_{2+3}, large hyaline spots near base

of cell r_{4+5} and near base and apex of cell dm, 1 marginal spot in cell m near apex of vein CuA, 2 indentations in cell cua and 1 or 2 spots along margin of anal lobe **4**

– Wing markings not as above (Figs 16, 31, 32, 42, 43); pterostigma usually with a subhyaline or fulvous basal patch or spot, marginal preapical hyaline spot in cell r_{2+3} usually present, and cell m usually with 2 or 3 hyaline marginal spots **5**

4 Face black in male, yellow in female; wing (Figs 20, 21) with basal spot in cell dm not distinctly larger than apical spot and not crossing or almost crossing cell; hyaline indentations in cell cua of approximately equal length, almost crossing cell but basal spot sometimes narrowly divided medially..... ..... ***P. acrostacta* (Wiedemann, 1824)**

– Face yellow in both sexes; wing with basal spot in cell dm distinctly larger than apical spot and crossing or almost crossing cell; basal hyaline indentation in cell cua much smaller than second indentation or broadly divided medially into 2 small spots; holotype illustrated by Hering 1941, fig. 4 .... ***P. fulvifacies* Hering, 1941**

5 Wing (Fig. 16) with base and pterostigma largely fulvous to pale brown, contrasting with rest of wing; cell m without an isolated anterobasal hyaline spot..... ***P. flavistigma* David & Hancock, sp. nov.**

– Wing (Figs 31, 32, 42, 43) with pattern variable but uniformly dark brown with hyaline spots and markings; cell m with an isolated anterobasal hyaline spot..... **6**

6 Scutellum with apical and basal setae..... ***P. platyptera* Hendel, 1915**

– Scutellum with only basal setae..... ***P. zodiacalis* (Bezzi, 1913)**

Key to all known species of *Platensina*

Modified from Hancock (2012).

1 Wing broad and almost circular beyond basal third, apex evenly rounded and entirely dark, without hyaline discal or marginal spots or indentations except for pair of small costal spots at bases of pterostigma and cell r_1 adjacent to apices of veins Sc and R_1, respectively; illustrated by Hardy 1974, fig. 129 [Philippines (Luzon)] ..... ***P. bezzii* Hardy, 1974**

– Wing often broad but distinctly longer than wide, apex at least slightly produced and with at least a hyaline apical spot in cell r_{4+5}; usually with hyaline discal and marginal spots or indentations..... **2**

2 Wing (Fig. 6) with hyaline apical band distinctly crossing veins R_{4+5} and M_1 into cells r_{2+3} and m_1 ..... **3**

– Wing (Figs 10, 16, 20, 21, 32, 43) with oval or quadrate hyaline apical spot confined to cell r_{4+5} 7

3 Male wing without hyaline spots or indentations apart from small marginal indentation in cell r_1 at apex of vein R_1 and crescentic hyaline apex; female wing with crescentic hyaline apex plus hyaline marginal spots and indentations and subbasal hyaline spot in cell dm but no spot near base of cell r_{4+5}; illustrated by Wang 1998, fig. 253–4 [China (Yunnan)] ..... ***P. nigripennis* Wang, 1998**

– Male wing (where known) with one broad or 2 narrow marginal hyaline indentations in cell r_1 near apex of vein R_1 and often a spot near base of cell r_{4+5}; female wing (where known) with hyaline medial spot close to line of crossvein r-m and often a spot near base of cell r_{4+5} **4**

4 Wing of both sexes without hyaline spot near base of cell r_{4+5} and hyaline apex in cell m separate from the 2 hyaline marginal spots; hyaline marginal indentation in cell r_1 broad and rectangular in male, divided into elongate indentation and 2 small round spots in female; male illustrated by Hardy and Drew 1996, fig. 167 [Australia (Queensland)] ..... ***P. parvipuncta* Malloch, 1939**

– Wing of both sexes (where known) with hyaline spot near base of cell r_{4+5}; apex with hyaline band in cell m enclosing one or both marginal spots, leaving no more than a single separate marginal spot; hyaline indentation from costa in cell r_1 not as above..... **5**

5 Male unknown; female posterior to vein R_{4+5} with spots in cells r_{4+5} (1, at base), bm (1, near apex), dm (1, near middle), m (1 marginal near apex of vein CuA), cua (3, 2 basal and 1 near middle) and anal lobe (1); not illustrated [Taiwan] ..... ***P. apicalis* Hendel, 1915**

– Female unknown; male with 1 or 2 hyaline indentations in cell r_1 near apex of vein R_1 and 1 or no hyaline marginal spots in cell m near apex of vein CuA separate from the apical hyaline area, large hyaline spots at base of cell r_1 and at basal third of cell dm, and 2 elongate marginal indentations in cell cua [India and Burma] **6**

6 Wing in cell r_1 with 2 hyaline indentations near apex of vein R_1; cell m with one hyaline marginal spot in addition to apical hyaline area; cell cua with hyaline marginal indentations reaching or almost reaching vein CuA; illustrated by Hering 1938, fig. 50 [NE Burma] ..... ***P. alboapicalis* Hering, 1938**

– Wing (Fig. 6) with cell r_1 with 1 hyaline indentation near apex of vein R_1 and cell m without a hyaline marginal spot in addition to apical hyaline area; cell cua with hyaline marginal indentations ending at or before middle of cell .... ***P. rabbanii* David & Hancock, sp. nov.**

7 Wing with cell c and basal two-thirds of pterostigma hyaline; hyaline marginal spots (including 2 in cell m_1 and 3 in cell cua) present but pale discal spots absent; head with 1–2 pairs of frontal setae; illustrated by Hardy 1974, fig. 127 [Philippines (Luzon)] ..... ***P. amita* Hardy, 1974**

– Wing with cell c not entirely hyaline and pterostigma with at most a hyaline basal spot; both hyaline marginal and pale discal spots usually present; head with 3 pairs of frontal setae **8**

8 One pair of scutellar setae, apicals absent; illustrated by Bezzi 1913, fig. 65, Hardy 1973, pl. v, fig. 45, Hardy 1974, fig. 130, Wang 1998, fig. 256 and this paper, figs 42–43 [India and Sri Lanka to Philippines, Indonesia and northern Australia] ..... ***P. zodiacalis*** **(Bezzi, 1913)**

– Two pairs of scutellar setae, apicals present..... **9**

9 Wing cell r_{2+3} with 2 narrow marginal hyaline spots or indentations; marginal hyaline indentations in cell r_1 close to apex of vein R_1 normally reduced in cell r_{2+3} to isolated spots in yellowish field; illustrated by Hancock 2012, figs 3–4 [Indonesia to NE Australia and Solomon Islands].... ***P. ampla*** **de Meijere, 1914**

– Wing cell r_{2+3} with 0–1 narrow marginal hyaline spots or indentations; marginal hyaline indentations in cell r_1 close to apex of vein R_1 present or reduced in cell r_{2+3} but not reduced to isolated spots in a yellowish field..... **10**

10 Wing with single large marginal hyaline indentation in cell r_1 close to apex of vein R_1 that extends across cell r_{2+3} and is aligned with posterior indentation in cell cua that crosses cell; cell m with single hyaline marginal spot placed close to apex of vein CuA; illustrated by Hardy 1974, fig. 128 [Philippines (Luzon)] ..... ***P. aptata*** **Hardy, 1974**

– Wing with 2 marginal hyaline indentations in cell r_1 close to apex of vein R_1, the distal one sometimes reduced and largely united with basal one, sometimes both reduced to small marginal spots or single indistinct pale area; cells m and cua not both with a single hyaline marginal spot or band..... **11**

11 Wing cell m with 3 hyaline marginal spots or indentations..... **12**

– Wing cell m with at most 2 hyaline marginal spots or indentations **13**

12 Wing cell dm with 3 rounded hyaline spots; cell m with 2 hyaline spots in anterobasal quarter; illustrated by Hardy and Drew 1996, fig. 168 [Australia (Queensland)]..... ***P. trimaculata*** **Hardy & Drew, 1996**

– Wing cell dm with 2 rounded hyaline spots; cell m with 1 hyaline spot in anterobasal quarter; illustrated by Wang 1998, fig. 251 [Japan (Ryukyu Is), Taiwan and China (Sichuan, Guangxi)] ..... ***P. assimilis*** **(Shiraki, 1968)**

13 Wing cell r_{4+5} with very small apical hyaline spot; illustrated by Hardy 1988, fig. 22 [Indonesia (Java, Sumba)] ..... ***P. sumbana*** **Enderlein, 1911**

– Wing cell r_{4+5} with large apical hyaline spot filling all or most of cell apex.... **14**

14 Wing cell r_1 with 2 large and quadrate hyaline indentations, distal one broader than wide, plus subapical posterior spot not reaching costa; cell m with 2 elongate hyaline indentations, the anterior one much smaller and narrower than the posterior one; cell cua with 3 broad hyaline indentations, the basal pair crossing or almost crossing cell, plus basally with extension of large hyaline mark in anal lobe; male with distinct white or silvery parafacial stripes (females unknown) **15**

– Wing markings not as above, distal hyaline indentation in cell r_1 narrower than wide and/or one or both marks often reduced or absent, subapical spot in cell r_1, when present, small and marginal at costa or crossing cell, and marginal marks in cell m usually subequal in size; male without white or silvery parafacial stripes..... **16**

15 Wing (Figs 9, 10, 16) with dark markings anterior to vein R_{4+5} pale brown to yellow-brown in basal two-thirds and dark brown elsewhere; pterostigma with basal spot yellow; hyaline spot at base of cell r_{4+5} circular; head with parafacial stripes white [southern India (Karnataka, Tamil Nadu)] ..... ***P. flavistigma* David & Hancock, sp. nov.**

– Wing with dark markings uniformly dark brown; pterostigma with basal spot hyaline; hyaline spot at base of cell r_{4+5} oval; head with parafacial stripes silvery; illustrated by Hardy 1973, fig. 149 [Thailand, Cambodia and Vietnam] ..... ***P. quadrula* Hardy, 1973**

16 Wing cell r_{2+3} without small and narrow marginal spot posterior to apex of vein R_{2+3} and pterostigma without hyaline basal spot; cell m with 1 small semicircular marginal hyaline spot near apex of vein CuA **17**

– Wing cell r_{2+3} with small and narrow marginal spot below apex of vein R_{2+3} and pterostigma often with hyaline basal spot; cell m usually with 2 small and often elongate marginal hyaline spots **18**

17 Face largely black in male, yellow in female; basal spot in cell dm not distinctly larger than apical spot and not crossing or almost crossing cell; hyaline indentations in cell cua of approximately equal length, almost crossing cell but basal spot sometimes narrowly divided medially; illustrated by Bezzi 1913, fig. 57, Hancock 2012, fig. 1 and this paper, figs 20–21 [India and Sri Lanka to southern China (Yunnan) and Cambodia] ..... ***P. acrostacta* (Wiedemann, 1824)**

– Face yellow in both sexes; basal spot in cell dm distinctly larger than apical spot and crossing or almost crossing cell; basal hyaline indentation in cell cua much smaller than second indentation or broadly divided medially into 2 small spots; illustrated by Hering 1941, fig. 4 [India (Maharashtra, Rajasthan)] ..... ***P. fulvifacies* Hering, 1941**

18 Wing with discal spots often subhyaline or indistinct and pale brown; cell r_1 often with 0–2 small hyaline indentations or spots in basal portion (especially in males) or with 2 indentations often largely fused; cell cua with 2 or 3 small and isolated hyaline marginal spots and with or without additional small and isolated discal spot **19**

– Wing with discal spots normally hyaline and distinct; cell r_1 with second hyaline indentation distinct and at most weakly joined to first; cell cua with 2–3 hyaline marginal indentations not all small and isolated, basal pair often almost crossing cell or medially divided into separate spots **20**

19 Wing cell r_1 with basal hyaline indentations often reduced to 0–2 small hyaline spots (especially in males, better developed in females); cell cua with 3 small and isolated hyaline marginal spots and with or without additional small and isolated discal spots; anal lobe with 2 distinct hyaline marginal spots; illustrated by Hardy 1973, pl. v, fig. 44 and Wang 1998, figs 252 & 255 [India (Tamil Nadu), Thailand and West Malaysia to China (Guangxi, Fujian) and Taiwan] ..... ***P. tetrica* Hering, 1939**

– Wing cell r_1 with second hyaline indentation narrow and strap-like or fused with first indentation leaving only small dark costal spot between them; cell cua

with 2 small marginal spots; anal lobe with hyaline marginal spots vestigial or absent; illustrated by Bezzi 1913, fig. 64 and Hardy 1973, pl. v, fig. 42 [southern Burma to Vietnam and Indonesia (Sumba)] ..... ***P. euryptera* (Bezzi, 1913)**

20 Wing cell m with a small anterobasal hyaline spot and no marginal spots; cell cua with 2 undivided indentations almost crossing cell; cell r_{4+5} with basal spot large and ovate, much larger than the 2 distinct spots in cell dm; illustrated by Hardy 1973, pl. v, fig. 43 [Thailand, Cambodia and Vietnam] ..... ***P. intacta* Hardy, 1973**

– Wing cell m with 2 small hyaline marginal spots; cell cua with 2 or 3 indentations, with at least the more distal of the 2 basal indentations divided medially and apical spot small or absent; cell r_{4+5} with basal spot small and circular, not much larger than the 2 distinct spots in cell dm.....**21**

21 Wing evenly rounded posteriorly, not distinctly angled basal of end of vein CuA and with numerous distinct discal spots, 1–2 in cell br, 3 in cell r_{4+5}, 1–2 in cell r_{4+5}, 2 in cell dm and 1 anterobasally in cell m; posterior marginal spot in cell m distinctly larger and broader than anterior marginal spot; illustrated by Wang 1998, fig. 259–260 [Japan (Ryukyu Is), China (Sichuan) and possibly Indonesia (West Papua)] ..... ***P. shirouzui* (Ito, 1984)**

– Wing distinctly angled posteriorly, broadest just basal of end of vein CuA and with only 3 distinct discal spots, 1 at base of cell r_{4+5} and 2 in cell dm; posterior marginal spot in cell m not distinctly larger and broader than anterior marginal spot.....**22**

22 Apical scutellar setae distinct, about half length of basals; anal lobe of wing with hyaline marginal spots vestigial or absent; posterior hyaline marginal spot in cell m narrow, elongate and perpendicular; illustrated by Hancock 2012, fig. 2 [southern Thailand to Indonesia (Java, Sulawesi)] ....***P. amplipennis* (Walker, 1860)**

– Apical scutellar setae weak, about quarter length of basals; anal lobe of wing with hyaline marginal spots round and distinct; posterior hyaline marginal spot in cell m often short and broad; illustrated by Hancock 2012, figs 5–6 and this paper, figs 31–32 [India to Japan (Ryukyu Is), Australia, Solomon Islands and Vanuatu] ..... ***P. platyptera* Hendel, 1915**

New species

***Platensina rabbanii* David & Hancock, sp. nov.**
http://zoobank.org/FF51328D-55A7-49B0-934F-48D1D61EF92D

Type locality. India: Meghalaya, East Khasi Hills, Laitsopliah.

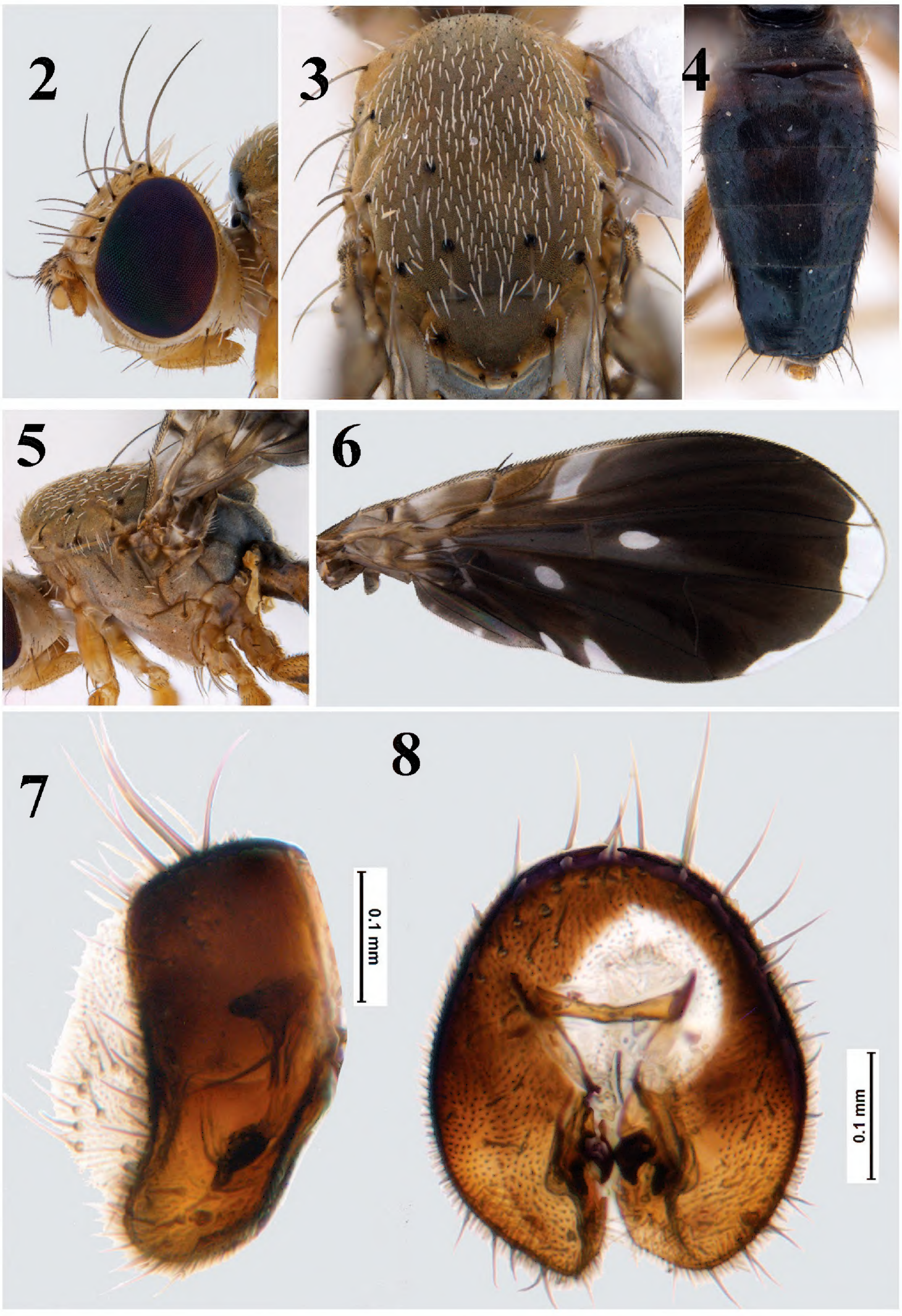
Type data. ***Holotype*** male, pinned. Original label: "INDIA: Meghalaya, East Khasi Hills, Laitsopliah, 17.iii.2021, Rabbani M. K." (NIM).

Diagnosis. This species is similar to *P. alboapicalis* Hering from Burma in the presence of an apical hyaline band extending from cell r_{2+3} to cell m_1 but can be differentiated by the presence of a single hyaline indentation in cell r_{2+3}, versus two

Figure 1. Habitus (lateral) of male of *Platensina rabbanii* David & Hancock, sp. nov.

hyaline indentations and spot in *P. alboapicalis*; the apical hyaline band restricted to the apical one-third of cell r_{2+3}, versus the whole of apex of cell r_{2+3} in *P. alboapicalis*; and the hyaline indentations in cell cua ending well before vein CuA, unlike in *P. alboapicalis* where they almost reach vein CuA.

Description. Male. Medium-sized fly (4.03 mm long) with broad, dark brown wing with hyaline apex.



Figures 2–8. *Platensina rabbanii* David & Hancock, sp. nov. **2** head (lateral view) **3** thorax (dorsal view); **4** abdomen (dorsal view) **5** thorax (lateral view) **6** wing **7** epandrium (lateral view) **8** epandrium (posterior view).

Head (Fig. 2): nearly as high as long; frons fulvous with three pairs of frontal setae and two pairs of orbital setae (posterior one white); ocellar triangle fuscous, with well developed ocellar setae; medial vertical seta black; lateral vertical seta, paravertical seta and postocellar seta lanceolate and white; postocular setae black interspersed with prominent, white lanceolate setae. Face fulvous without any markings. Scape and pedicel fulvous, first flagellomere less than half length of face, concolorous with frons, arista short pilose. Gena narrow, with prominent genal seta, subvibrissal setae present.

Thorax (Figs 3, 5): Scutum uniformly grey microtrichose, with creamy-white setulae. Chaetotaxy well developed: 1 postpronotal, 1 presutural supra-alar, 1 anterior notopleural, 1 posterior notopleural, 1 postsutural supra-alar, 1 dorsocentral placed in line with postsutural supra-alar, 1 postalar, 1 intra-alar, and 1 prescutellar acrostichal seta. Scutellum brown with two pairs of scutellar setae; apical one less than half length of basal one. Anepisternum grey, with single seta near phragma; anepimeron grey, with single seta, katepisternum fulvous, with single seta; anatergite dark brown; katatergite and meron fulvous. Legs predominantly fulvous without any black/dark markings except basal, brown longitudinal streaks present on ventral surface of mid and hind femora; forefemur with single row of 4 ventral setae.

Wing (Fig. 6) broad, with posterior margin evenly rounded, length 4.47 mm; length/width ratio-2.10, predominantly dark brown, with hyaline indentations and spots; cell bc hyaline, cell c predominantly moderate brown, with narrow basal and broader medial hyaline areas, pterostigma entirely moderate brown without any hyaline markings, cell r_1 with one trapezoidal basal hyaline indentation not extending beyond vein R_{2+3}, cell r_{4+5} with elongate subbasal hyaline spot, cell dm with large hyaline spot at basal third, cell cua with two short hyaline indentations not reaching vein CuA, and apical hyaline band extending from apex of cell r_{2+3} to cell m; anal lobe and alula dark brown.

Abdomen (Fig. 4): Entirely black with yellowish orange patches laterally on tergites 1–2.

Male genitalia (Figs 7, 8). Epandrium broad, lateral surstylus as broad as epandrium and connected at acute angle to epandrium (Fig. 7); apex of lateral surstylus blunt (in lateral view); proctiger short, smaller than epandrium; epandrium elongate oval in posterior view, medial surstylus with well developed prensisetae (lateral one broader than medial one).

Female. Unknown

Distribution. Meghalaya (Northeast India).

Habitat. Marshy grasslands.

Etymology. The species is named after the collector, Rabbani Mehaboob K. It is a noun in apposition.

***Platensina flavistigma* David & Hancock, sp. nov.**
http://zoobank.org/7512FEB5-3888-4CFF-8229-80C146706273

Platensina quadrula: Hancock 2012: 315 (misidentification, India record).

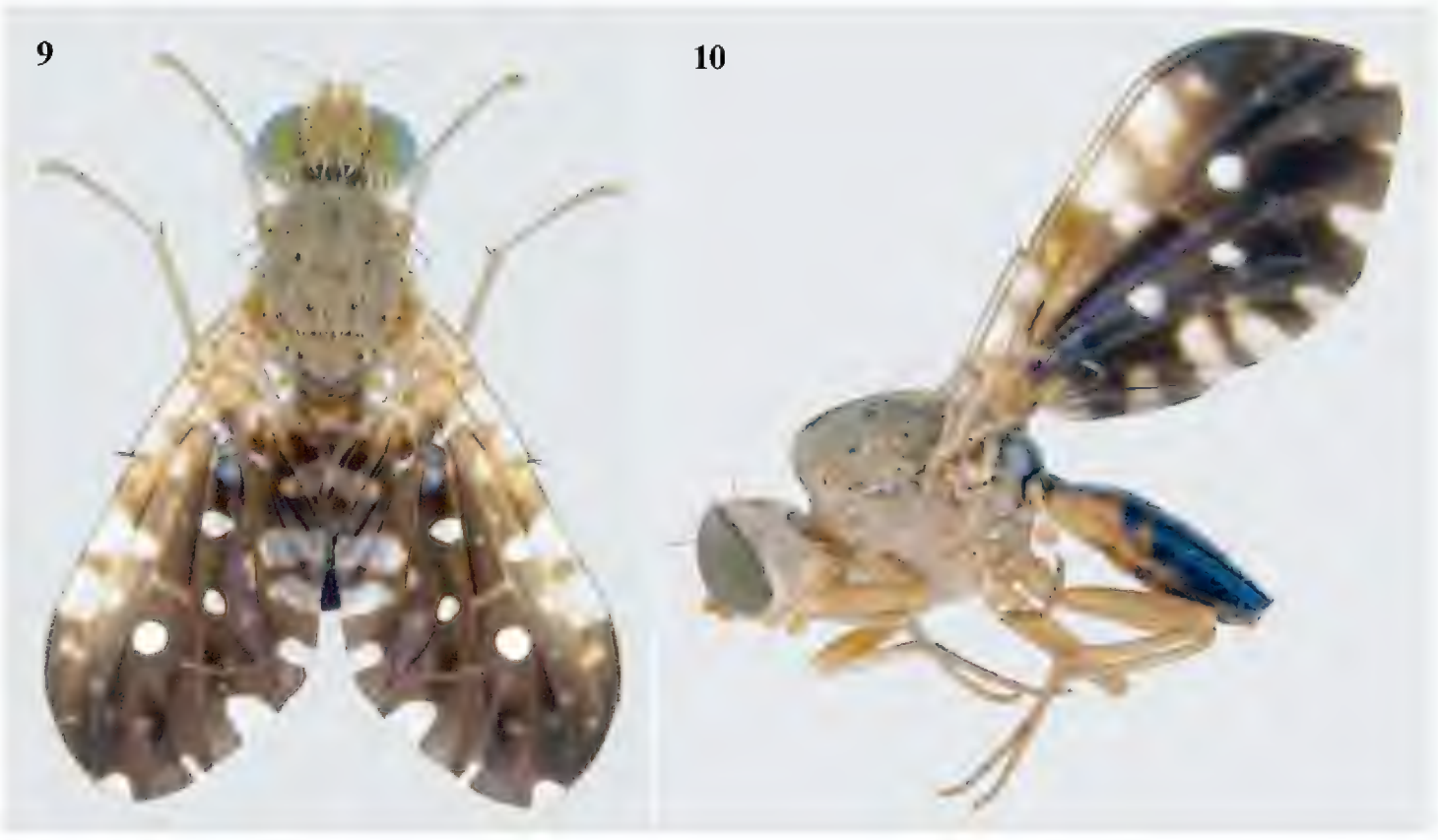
Type locality. India: Karnataka, Bangalore, Attur.

Type data. ***Holotype*** male, pinned. Original label: "INDIA: Karnataka, Bangalore, Attur, 05.ii.2020, Sachin K (NIM)". ***Paratypes*:** **India:** Periyakulam, 30.iii.2012, David, K. J. (1♂ NIM); India, Tamil Nadu, Thandikudi, C.R.S, 31.iii.2012, David, K. J. (1♂ NIM).

Diagnosis. This species is similar to *P. quadrula* Hardy from Thailand, Cambodia and Vietnam in the presence of two broad quadrate areas in wing cell r_1, an enlarged basal discal spot in cell r_{4+5} and large, broad hyaline indentations in cell cua. It can be differentiated by the lack of silvery facial spots and white rather than silvery parafacial stripes in males, as well as the angulate posterior wing margin, pterostigma predominantly fulvous/yellow and pale brown, and epandrium of uniform width throughout its length, whereas in *P. quadrula* the parafacial is silvery rather than white and facial silvery spots are present lateroventrally in males, the wing is evenly rounded posteriorly, the pterostigma is hyaline basally and dark brown apically, and the epandrium tapers apically. This species was mistakenly listed as *P. quadrula* from India by Hancock (2012).

Description. Male. Medium-sized fly (4.10–4.99 mm long) with broad, angulate wing with fulvous markings (Figs 9, 10).

Head (Figs 11, 12). as high as long; frons fulvous with three pairs of frontal setae and two pairs of orbital setae; ocellar triangle dark brown, with well-developed ocellar seta; medial vertical seta black; lateral vertical seta, paravertical seta and postocellar setae white; postocular setae black interspersed with prominent, white lanceolate setae. Face fulvous with broad orange-brown patches on ventral half of antennal groove. Scape and pedicel fulvous, first flagellomere shorter than face, concolorous with frons, arista short pilose. Parafacial alongside ventral half of face distinctly whitish. Gena narrow, with prominent genal seta, subvibrissal setae present.



Figures 9–10. Habitus of *Platensina flavistigma* David & Hancock, sp. nov. **9** dorsal view **10** lateral view.

Figures 11–16. *Platensina flavistigma* David & Hancock, sp. nov. **11** head (profile view) **12** head (frontal view) **13** abdomen (dorsal view) **14** thorax (lateral view) and legs **15** scutum **16** wing.

Thorax (Figs 14, 15). Scutum uniformly grey microtrichose with creamy-white setulae. Chaetotaxy well developed: 1 postpronotal, 1 presutural supra-alar, 1 anterior notopleural, 1 posterior notopleural, 1 postsutural supra-alar, 1 dorsocentral placed in line with postsutural supra-alar, 1 postalar, 1 intra-alar, and 1 prescutellar acrostichal seta. Scutellum grey with two pairs of scutellar setae; apical one less than half length of basal one. Anepisternum grey, with single seta near phragma; anepimeron grey, with single seta, katepisternum fulvous, with single seta; anatergite dark brown; katatergite and meron fulvous. Legs predominantly fulvous without any black/dark markings; forefemur with single row of 4 ventral setae.

Wing (Fig. 16) broad, angulate, length 4.44–4.99 mm, length/width ratio, 1.92–2.05; predominantly dark brown with hyaline indentations and spots; cell bc hyaline, cell c predominantly hyaline with pale basal and medial infuscations, pterostigma fulvous basally, dark brown apically, cell r_1 with two broad quadrate indentations and small posterior subapical hyaline spot, the proximal quadrate indentation extended to vein R_{4+5}, cell r_{4+5} with large circular hyaline spot near base and large, semicircular hyaline apical spot, cell dm with two large hyaline spots, cell m with two marginal hyaline marks, subbasal one much larger than subapical one, cells r_{2+3} and r_{4+5} with indistinct and isolated pale brown subapical spots, cell cua with three large marginal hyaline indentations, basal two almost reaching vein CuA, and anal lobe with two broad subhyaline markings, proximal one crossing into cell cua.

Abdomen (Fig. 13). Entirely black with yellowish orange patches laterally on tergites 1–3.

Male genitalia. Epandrium broad, lateral surstylus as broad as epandrium (Fig. 17); apex of lateral surstylus blunt (in lateral view); proctiger short, smaller than

Figures 17–19. *Platensina flavistigma* David & Hancock, sp. nov. **17** epandrium (lateral view) **18** epandrium (posterior view) **19** glans of phallus.

epandrium; epandrium oval in posterior view (Fig. 18); medial surstylus shorter than lateral surstylus and with well developed prensisetae (lateral one broader than medial one). Phallus elongate (1.78 mm long), with sclerotised acrophallus (Fig. 19).

Female. Unknown

Etymology. The specific name is derived from two Latin words *flavus* (=yellow) and *stigma* (=ptersotigma).

Distribution. Karnataka and Tamil Nadu (southern India).

DNA Barcode. NCBI GenBank accession number – MT019893 (1♂, India: Karnataka, Bangalore, Attur, 17.v.2018, Prabhu, G.)

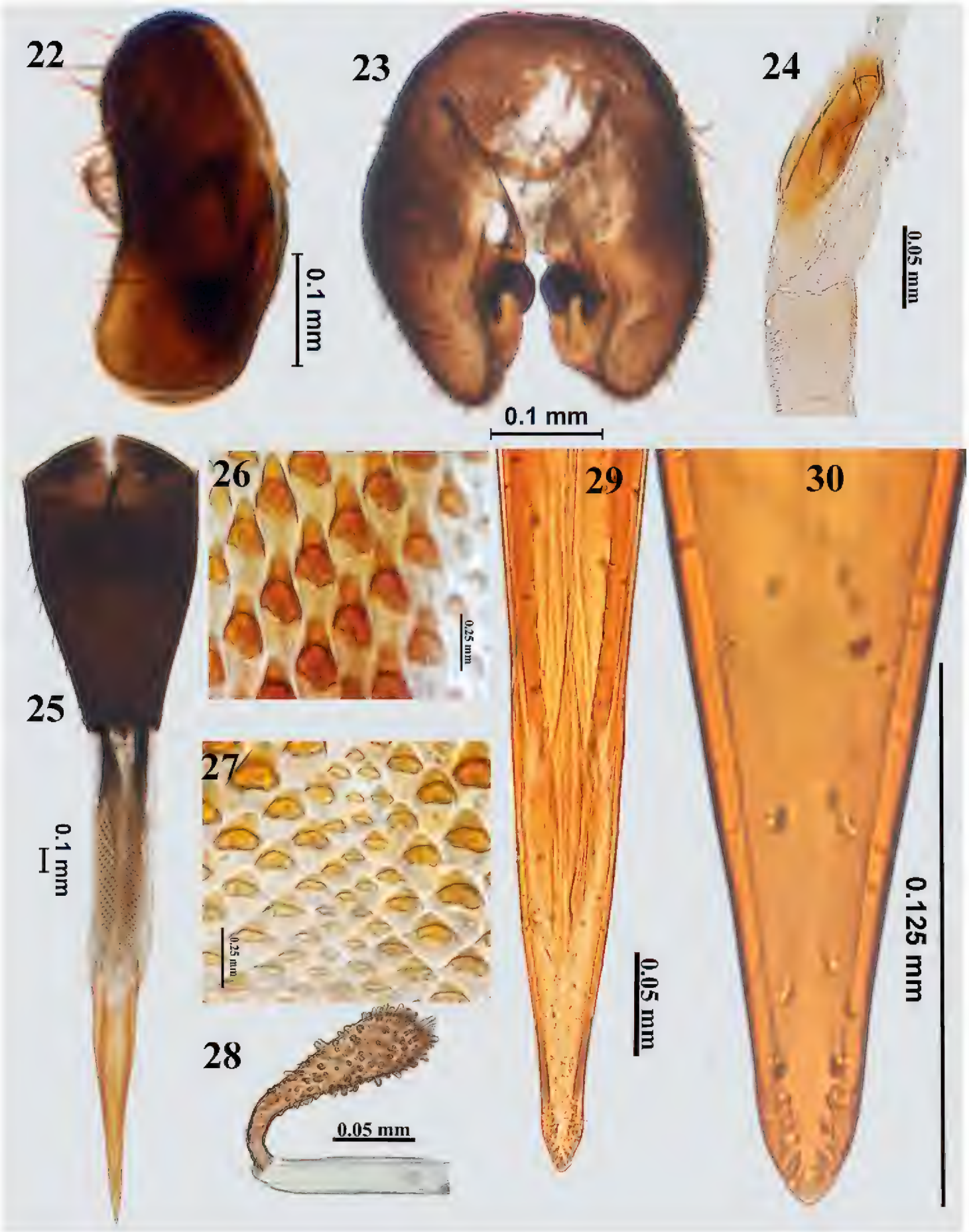
Taxonomic notes on other species of *Platensina* from India

Platensina acrostacta (Wiedemann)

Tephritis acrostacta Wiedemann, 1824: 54. Type locality: India-orientali [east India].
Ensina guttata Macquart, 1843: 387. Type locality Coromandel coast, Tamil Nadu, India.
Trypeta stellata Walker, 1849: 1030. Type locality North Bengal, India.
Trypeta voneda Walker, 1849: 1028. Type locality 'Bahia, Brazil' [*recte* Bengal, India].

Material examined. India: 1♂, Karnataka, Tumkur, Kunigal, 05.iv.2013, Prabhu G. "leg"; 1♂, Karnataka, Bengaluru, Hebbal, 28.xi.2014, Prabhu G. "leg"; 1♂, Karnataka, Bengaluru, Attur, 24.iii.2016, Prabhu G. "leg"; India. 1♀, Karnataka, Chikkaballapur, 12.iv.2016, Prabhu G. "leg"; 1♂,1♀ Karnataka, Bengaluru, Attur, 16.v.2017, Prabhu G. "leg"; 1♂,1♀, Karnataka, Bengaluru, Attur, 20.vi.2017, Prabhu G. "leg"; 1♀, Karnataka, Bengaluru, Attur, 04.vii.2017, Prabhu G. "leg"; 1♂, Karnataka, Bengaluru, Attur, 07.ii.2018, Prabhu G. "leg"; 1♀, Karnataka, Bengaluru, Attur, 21.iii.2018, Prabhu G. "leg"; 1♂,1♀, Karnataka, Bengaluru, Attur, 24.iv.2018, Prabhu G. "leg"; 1♂, Karnataka, Bengaluru, Hebbal, 03.v.2018, Prabhu G. "leg"; 1♂,1♀, Karnataka,

Figures 20–21. *Platensina acrostacta* (Wiedemann) **20** habitus (dorsal) **21** habitus (lateral).



Figures 22–30. *Platensina acrostacta* (Wiedemann) **22** epandrium (lateral) **23** epandrium (posterior) **24** glans of phallus **25** ovipositor **26** spicules on proximal end of eversible membrane **27** spicules on distal end of eversible membrane **28** spermatheca **29** aculeus **30** aculeus tip (100×).

Bengaluru, Attur, 17.v.2018, Prabhu G. "leg"; 2♀, Karnataka, Bengaluru, Attur, 24.v.2018, Prabhu G. "leg"; 1♂, Karnataka, Bengaluru, Attur, 14.vi.2018, Prabhu G. "leg"; 1♂, Karnataka, Bengaluru, Attur, 14.x.2019, Sachin K. "leg"; 1♂, Kerala,

Kasargod, C.P.C.R.I, 17.ii.2015, Prabhu, G."leg", 1♀,1♂, Tamil Nadu, Periyakulam, 30.iii.2012, David, K.J."leg", 1♂, Tamil Nadu, Thandikudi, C.R.S, 01.iv.2012, David, K.J. "leg"(NIM).

Diagnosis (Figs 20–30). A medium-sized species separated from the similar *P. fulvifacies* Hering largely by the black face in males; length of male (4.29–4.47 mm), of female (5.45–5.49 mm). This species was adequately described by Hardy (1973) except for detailed structures of male and female postabdomen. Epandrium broad, not demarcated from surstylus (profile view); proctiger smaller than epandrium. Epandrium and surstyli elongate oval in posterior view; prensisetae well developed. Phallus elongate (2.71 mm); glans with a sclerotised rod. Oviscape (1.21 mm) dark brown to black, dorsoventrally flattened; eversible membrane shorter than oviscape (0.96 mm) with conical spicules in the proximal region and triangular spicules towards distal end. Aculeus (1.01 mm) as long as eversible membrane and with triangulate apex. Spermatheca elongate oval with numerous papillae.

Distribution. This species is known from India (Karnataka, Tamil Nadu and Kerala) and Sri Lanka to Cambodia (Hancock 2012).

DNA Barcode. NCBI GenBank accession number – MT019891 (1♂, India: Karnataka, Bangalore, Attur, 29.v.2019, Sachin, K.).

Platensina fulvifacies Hering

Platensina fulvifacies Hering, 1941: 71. Type locality Lonaula, Maharashtra, India.

Diagnosis. This species is similar to *P. acrostacta* but can be differentiated primarily by the yellow face in males and larger basal spot in cell dm. Specimens were not available for study but photographs of both sexes have been examined: 2♂, 2♀, India: Rajasthan, Jodhpur District, 10 km SW Jodhpur, Machia Safari Pk, Malaise in dry wash 29.II–5.III.2008, 300 m, 26°18.60'N, 72°58.71'E (in California Academy of Sciences, San Francisco, California, USA).

Distribution. This endemic Indian species is known only from Maharashtra and Rajasthan.

Platensina platyptera Hendel

Platensina platyptera Hendel, 1915: 461. Type locality Taihorin, Taiwan.
Platensina malaita Curran, 1936: 29. Type locality Tai Lagoon, Malaita, Solomon Is.
Platensina dubia Malloch, 1939: 459. Type locality Gordonvale, Qld, Australia.
Platensina amplipennis: authors, *nec* Walker, 1860. Misidentifications.

Material examined. India: 1♀, Karnataka, Bengaluru, G.K.V.K, 02.ii.2012, David K.J. "leg"; 1♂, A&N Islands, Middle Andamans, Kadamtala, 09.iii.2012, David, K.J.

"leg"; 1♀, Karnataka, Mandya, Maddur, 09.i.2013, David, K.J. "leg"; 1♀, Karnataka, Uttara Kannada, Dandeli, 15.i.2015, Rajesh S. "leg"; 1♀, Meghalaya, Mawlynnong Road, 12.x.2019, David, K.J. "leg" (NIM).

Diagnosis (Figs 31, 32). This species was originally described by Hendel (1915) from Taiwan. It was recorded from India by Hancock (2012), based on photographs by the senior author. It is a medium-sized species with broad quadrate hyaline markings in cells c and r_1, round hyaline spots along the wing margin and in almost all the cells. It is similar to *P. zodiacalis* (Bezzi) but can be differentiated by the presence of apical scutellar setae.

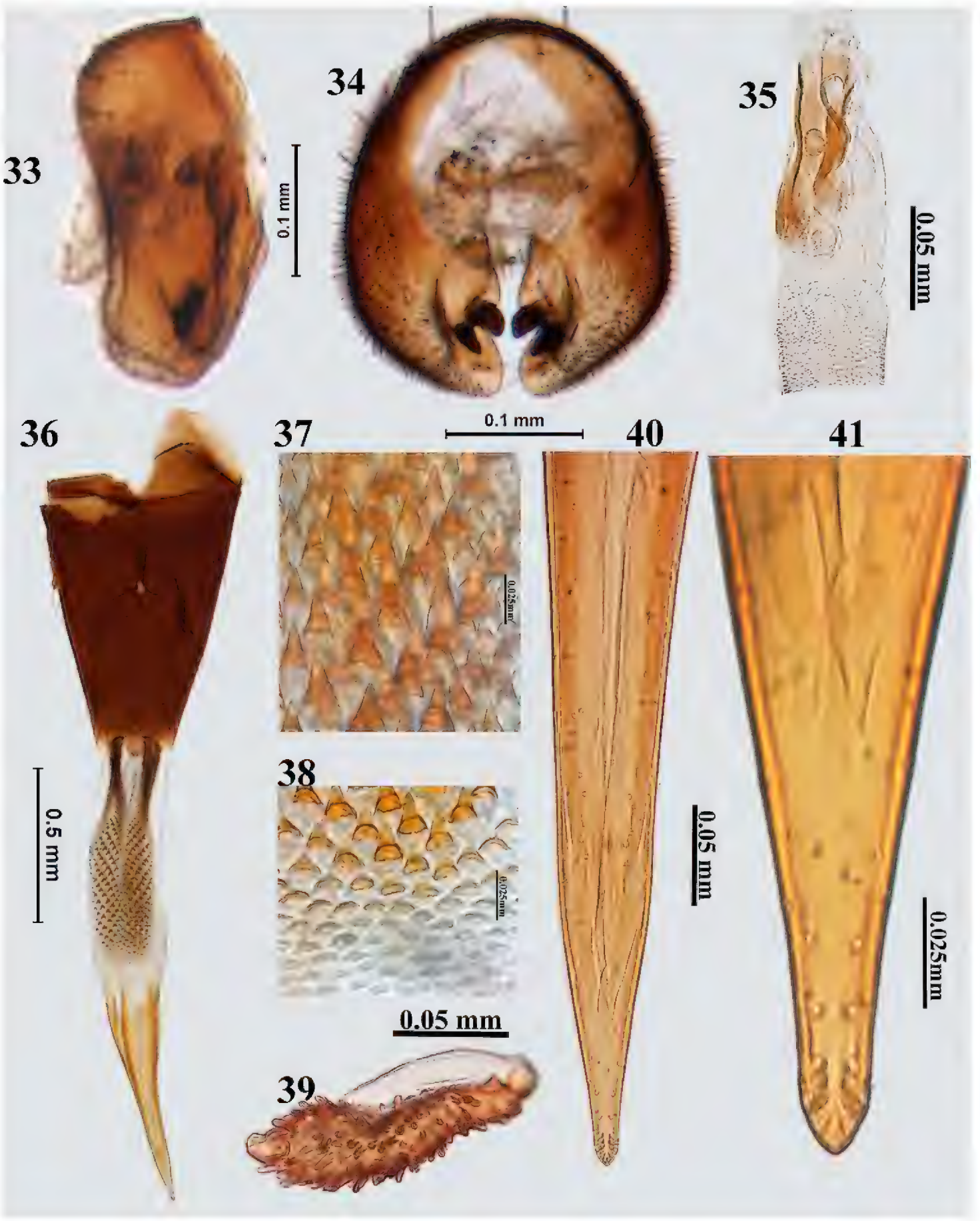
Male genitalia. Epandrium (Fig. 33) dark brown, heavily sclerotised, with no demarcation from lateral surstylus (in profile view); epandrium and surstyli oval in posterior view, with well developed prensisetae (Fig. 34). Phallus elongate (1.54 mm long including glans); glans stout, with broad sclerotised rod (Fig. 35).

Female genitalia. Oviscape 0.99 mm long, dark brown, conical, dorsoventrally flattened (Fig. 36); eversible membrane 0.83 mm long, shorter than oviscape, with conical spicules along entire length except for a few rows of flattened ones distally (Figs 37, 38); taeniae short, dark brown, 0.25 of length of eversible membrane. Aculeus shorter than eversible membrane, not dorsoventrally flattened, curved at its proximal end; apex of aculeus pointed and conical (Figs 40, 41). Spermatheca brown, club-shaped, with numerous papillae (Fig. 39).

Distribution. This species is widespread from India (Kerala, Karnataka, Meghalaya, Andaman and Nicobar Islands) to Japan and Australasia (Hancock 2012).

DNA Barcode. NCBI GenBank accession number – MW448367 (1♂, India: Kerala, Kannur, Aaralam, 13.i.2020, David, K. J.).

Figures 31–32. *Platensina platyptera* Hendel **31** habitus (dorsal) **32** habitus (lateral).



Figures 33–41. *Platensina platyptera* Hendel **33** epandrium (lateral) **34** epandrium (posterior view) **35** glans of phallus **36** ovipositor **37** spicules on proximal end of eversible membrane **38** spicules on distal end of eversible membrane **39** spermatheca **40** aculeus **41** aculeus tip (100×).

Platensina tetrica Hering

Platensina tetrica Hering, 1939a: 179. Type locality Trichinopolis, Tamil Nadu, India.
Platensina fukienica Hering, 1939b: 146. Type locality Fujian, China.

Diagnosis. This species was adequately described by Hering (1939a, b) and is characterised by the reduced and often indistinct hyaline markings. Indian specimens were not available for study but wings of both *P. tetrica* Hering and *P. fukienica* Hering, considered synonyms by Hancock (2012), were illustrated by Wang (1998).

Distribution. This species is known in India only from the type locality in Tamil Nadu. Elsewhere, it is known from China, Taiwan, Vietnam and West Malaysia (Hancock 2012).

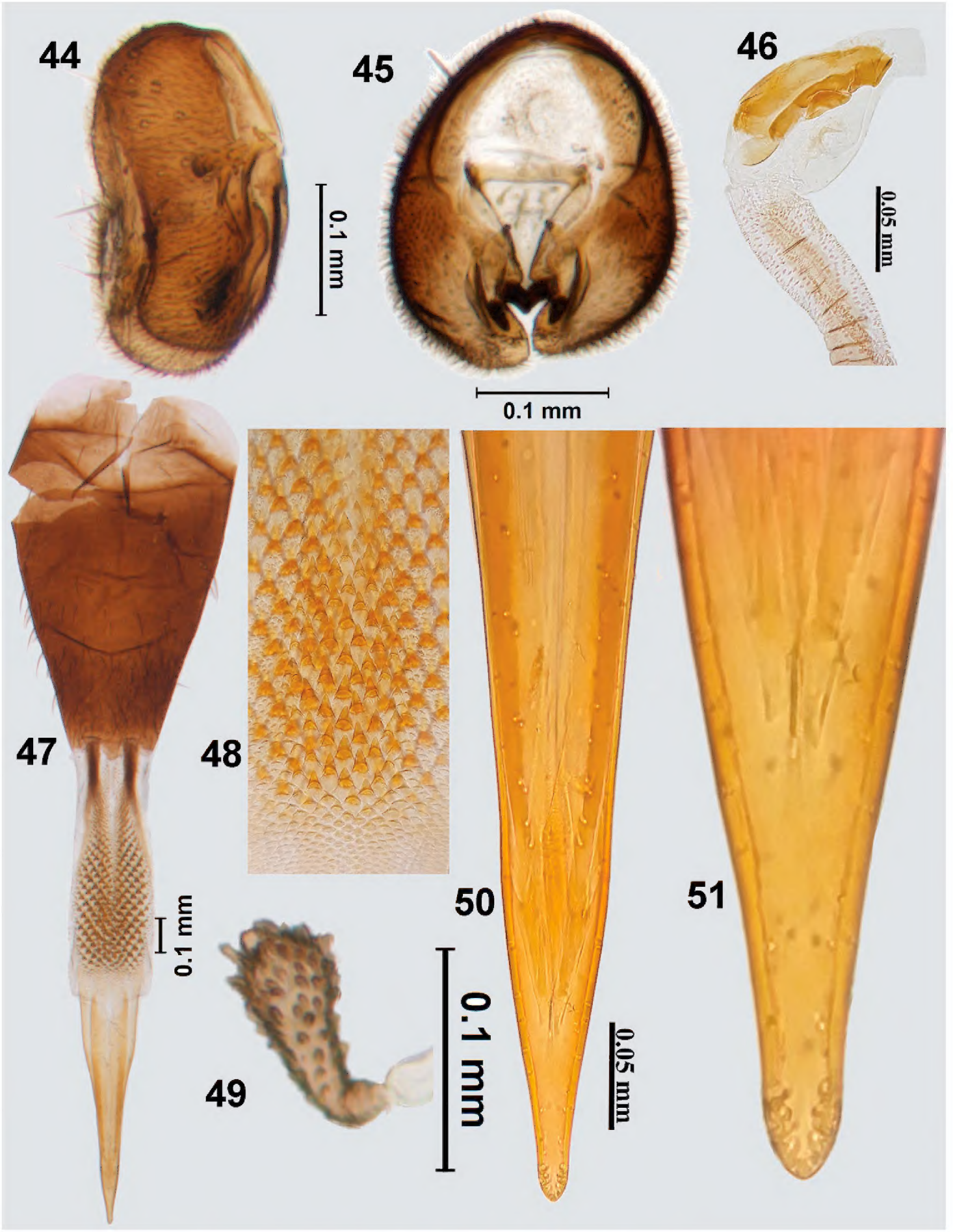
Platensina zodiacalis (Bezzi)

Tephritis zodiacalis Bezzi, 1913: 163. Type locality Calcutta [Kolkata], India.
Platensina zodiakalis: Hering 1956: 69. Lapsus calami.
Platensina zodiacalis: Hendel 1915: 461.

Material examined. India: 1♂, Karnataka, Madikeri, Chettalli, 05.xi.2012, David K.J. "leg"; 1♀, Assam, Dibrugarh, 07.xi.2014, Ramesh Kumar A. "leg"; 1♂, Karnataka, Kidu, CPCRI, 19.ii. 2015, David K.J. "leg"; 1♂, Karnataka, Chettalli, C.H.E.S, 03.ii.2021, David K.J. "leg"; 1♂, Assam, Barpeta, K.V.K, 09.iii.2021, Sachin K. "leg"; 1♂, Assam, Barpeta, K.V.K, 10.iii.2021, David. K.J. "leg"; 1♀, Assam, Chirang, K.V.K, 13.iii.2021, Sachin K. "leg"; 1♂, Assam, Golpara, 14.iii.2021, Rabbani M.K. "leg" (NIM).

Diagnosis. This species was adequately described by Bezzi (1913) except for the postabdominal structures. It is almost inseparable from *P. platyptera* except for the presence of only basal scutellar setae instead of both apical and basal setae as in *P. platyptera* (Figs 42, 43).

Figures 42–43. *Platensina zodiacalis* (Bezzi) **42** habitus (dorsal) **43** habitus (lateral).



Figures 44–51. *Platensina zodiacalis* (Bezzi) **44** epandrium (lateral) **45** epandrium (posterior view) **46** glans of phallus **47** ovipositor **48** spicules on eversible membrane **49** spermatheca **50** aculeus **51** aculeus tip (100×).

Male genitalia. Epandrium (Fig. 44) brown, sclerotised, with no demarcation from lateral surstylus (in profile view); epandrium and surstyli oval in posterior view, with well-developed prensisetae (Fig. 45). Phallus 1.39 mm long including glans; glans stout, with broad sclerotised rod (Fig. 46).

Female genitalia. Oviscape 0.92 mm long, dark brown, conical, dorsoventrally flattened (Fig. 47); eversible membrane 0.72 mm long, shorter than oviscape, with conical spicules along entire length except for a few rows of flattened ones distally (Fig. 48); taeniae short, dark brown, 0.25 length of eversible membrane. Aculeus shorter than eversible membrane, 0.63 mm long, dorsoventrally flattened; apex of aculeus rounded (Figs 50, 51). Spermatheca brown, club-shaped, with numerous papillae (Fig. 49).

Distribution. This species is widespread from India (Karnataka, Assam) and Sri Lanka to southern China and Australia (Hancock 2012).

Evolutionary divergence among the Indian species of *Platensina*

Table 1 shows the pair-wise evolutionary divergence/distance between four sequences available in NCBI database for three species namely *P. acrostacta*, *P. platyptera* and *P. flavistigma*. Evolutionary distance between *P. flavistigma* David & Hancock, sp. nov. and *P. acrostacta* is 0.0429 and between *P. flavistigma* and *P. platyptera* is 0.0759 which reveals that *P. flavistigma* is a distinct species in *Platensina* based on the available sequences. Among the species included in the analysis, evolutionary distance between *P. platyptera* and *P. acrostacta* was the highest (0.0837), which is evident in the morphological differences between these two species with respect to facial markings and wing pattern.

Table 1. Evolutionary divergence among the Indian species of *Platensina*.

Species name with accession numbers	*P. acrostacta* (MH748566)	*P. platyptera* (MW448367)	*P. flavistigma* (MT019893)	*P. acrostacta* (MT019891)
P. acrostacta (MH748566)				
P. platyptera (MW448367)	0.0837			
P. flavistigma (MT019893)	0.0429	0.0759		
P. acrostacta (MT019891)	0.0036	0.0882	0.0470	0.0000

Acknowledgements

All authors except the second author are grateful to Dr M. Nagesh, Director, ICAR-National Bureau of Agricultural Insect Resources, Bengaluru, India for the facilities used in this study, and to the Science and Engineering Research Board (SERB), Department of Science and Technology, Government of India (CRG/2018/003247 and CRG/2019/001619) for financial support. We thank Dr S.V. Korneyev for photographs of *P. fulvifacies* from Rajasthan.

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